

A cross-sectional study of stressors and coping mechanisms used by radiation therapists and oncology nurses: Resilience in Cancer Care Study

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Abstract

Introduction: Occupational stress and burnout are well-recognised experiences reported by cancer care workers. The aim was to describe the frequency and severity of potential stressors as well as the effectiveness of coping skills of radiation therapists (RTs) and oncology nurses (ONs), which make up the two largest occupational groups in cancer care. **Methods:** A questionnaire was distributed to RTs and ONs in two large tertiary hospitals in Queensland. Descriptive data regarding severity of potential stressors at home and work as well as the perceived effectiveness of preferred coping styles for each stressor was compared for each professional group. Respondents were asked questions about their personal circumstances and to also complete five standardised questionnaires measuring resilience, mental well-being, depression, anxiety and burnout. **Results:** There were 71 respondents representing a response rate of 26%. The types of stressors differed between the two groups but both reported that heavy workload was the most severe workplace stressor. RTs reported higher stressor and coping strategy frequency than ONs. There were no identifiable differences between RTs and ONs in the types or effectiveness of coping strategies employed at home or work. Mental well-being for both groups was inversely correlated with depression, anxiety and burnout and positively correlated with resilience. **Conclusions:** RTs experienced higher mean scores for stressors and coping than ONs. There were no significant between-group differences for anxiety, depression, burnout, mental well-being or resilience.

Introduction

Stress is a term that is commonly heard within the work environment and describes a variety of disturbing and symptomatic experiences. There are a number of theoretical frameworks which help describe the process.¹ It may be defined as a complex series of subjective phenomena, including cognitive self-appraisals of threat, harm and challenge; stress emotions and coping responses. Stress is experienced when the demands of the situation exceed the person's resources and some type of harm or loss is anticipated. Coping is

conceptualised as efforts to ameliorate the perceived threat.²

Radiation therapists (RTs) and oncology nurses (ONs) make up the two largest professional groups within the cancer workforce. Both groups interact directly with cancer patients and are required to deal with confronting and sometimes demanding caseloads which may impact on stress, burnout and general well-being. Occupational stress and burnout have been reported previously in these professional groups.^{3–6}

Within the Australian workforce, it is well recognised that burnout will occur in about one-third of Australian

cancer workers.^{7,8} High levels of worker well-being are seen in healthy workers who have low psychological distress, high work engagement and low burnout.⁸ Health care managers need to understand the types of stressors that lead to burnout and the types of coping mechanisms that are used. This may provide valuable information to inform the design of interventions aimed at improving the well-being of cancer workers.

Stressors within a radiation oncology work environment are multi-factorial and may vary with the department and different professional streams. Mazur *et al.* categorised stressors in the clinical radiation oncology environment.⁹ These include:

- 1 *Technical* stressors such as computer software or hardware malfunctions;
- 2 *Environmental* stressors such as noise;
- 3 *Teamwork* stressors caused by delays in information exchange such as waiting for someone to sign off on a plan;
- 4 *Time* stressors from the need to meet deadlines;
- 5 *Patient* stressors caused from meeting patient needs; and
- 6 *Interruption* stressors caused by physical interruption such as pages and phone calls.

Understanding the types of stressors and coping mechanisms for cancer workers is fundamental to designing interventions to reduce them. Stresses may come from meeting patient needs as well as from within the complex teams that deliver health care. The Resilience in Cancer Care (RICC) is a prospective three-stage project designed to develop a tailored strengths-based intervention to improve the resilience, well-being and work engagement of cancer workers. Stage 1 consisted of an interview study of RTs and ONs at two large tertiary cancer hospitals in Brisbane, Australia, which provided baseline data regarding potential workplace and non-workplace stressors experienced by these service providers (C.F. Sharpley, A.A. Poulsen, K.C. Baumann, M.G. Poulsen, 2013, unpubl. data). Major sources of stress in the workplace for both groups included administrative, patient, equipment and staff issues. A variety of coping mechanisms were described in the interviews and there were no differences reported across these two professional streams. Active coping strategies included seeking help from mental health professionals, talking with work colleagues or doing extra work. Passive coping strategies included withdrawing from work problems. Non-work-related stressors included health, relationship issues as well as financial problems. The types of coping strategies for non-work-related stressors included active approaches such as taking time for self or engaging in exercise, or passive approaches including acceptance of the stressor.

The aim of this paper (Stage 2 of the RICC study) was to further quantify the frequency and severity of documented stressors and coping mechanisms by way of a questionnaire distributed to RTs and ONs within the same two hospitals. In addition, a number of standardised scales measuring depression, anxiety, mental well being, burnout and resilience were included in the survey to examine differences across professional streams and to determine relationships between these variables. This paper adds further to the evidence relating to occupational stress in RTs and ONs. The coping mechanisms used by workers were also evaluated in an attempt to quantitate their effectiveness.

Methods

Ethical clearance was obtained from the Hospital Ethics Committee. The questionnaire was developed using the information procured from interviews of ONs and RTs in Stage 1 of the RICC study. Results from these interviews were organised with the most frequently identified events or workplace stressors being collated following analysis of interview data. Questions about these events were formulated into a standardised questionnaire and anonymously collected via Survey Monkey in the March 2013.

To be eligible, participants were required to be either an RT or an ON employed at either of the two study hospitals. RTs were recruited from the Radiation Oncology Departments across both hospitals. ONs were invited from Day Care Oncology, Cancer Wards, Palliative Care and Radiation Oncology. Questions about age, gender, marital status, family circumstances, professional stream and hospital were collected. Additionally, survey respondents completed five standardised questionnaires measuring depression, anxiety, burnout, mental well-being and resilience.

Instruments

Patient Health Questionnaire (PHQ-9) was used to measure depression.¹⁰ The PHQ-9 has high specificity and sensitivity for identifying major depression. The test authors state that PHQ-9 total scores of 0–4 indicate “minimal depression;” “mild depression” is indicated by scores of 5–9; “moderate depression” by scores of 10–14; “moderately severe depression” by scores of 15–19; and “severe depression” by scores of 20–27. The Generalised Anxiety Disorder Assessment (GAD-7) was used to measure anxiety and has good reliability, criterion, construct, factorial and procedural validity. The GAD-7 items are scored from 0 to 3, with total scale scores ranging from 0 to 21. Cut-off scores of 5, 10, and 15

represent mild, moderate, and severe levels of anxiety. The test authors report that “most patients (89%) with GAD” score 10 or above, and “most patients without GAD” have scores <10.¹¹

Self-perceptions of well-being were evaluated using The Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS) containing seven items representing four aspects of psychological and eudaemonic well-being, and three items covering hedonic well-being or affect.¹² Robust measurement properties combined with brevity supports the use of the SWEMWBS to reduce respondent burden when change scores are required in intervention studies. Items are rated on a five-point scale from “none of the time” to “all of the time” with higher scores reflecting a higher level of mental well-being.

A single-item burnout score that has been used to evaluate physician burnout was included in order to minimise the survey burden.¹³ This single-item has high correlation with a core component of burnout, emotional exhaustion.¹⁴

Connor Davidson Resilience Scale is a 25-item score, each of which is rated on a 5-point (0–4) scale with higher scores reflecting more resilience.¹⁵ It measures personal competence, trust in one’s instincts, adaptability, control and spiritual influences. The CD-RISC has sound psychometric properties.

Multivariate analyses of variance (MANOVA) were undertaken for the total scores for each of the dependent variables in relation to direct patient care hours comparing gender and occupation with significance at the bivariate level being determined at 5%. These were adjusted for age to prevent any potential interaction.

Participants were asked to grade potential stressors at work and home using a 4-point scale from low to severe. There were 24 work-related stressors and 6 home-related stressors that were included in the questionnaire. For each stressor, participants were asked to indicate their preferred coping strategy, selected from the alternatives of: ignore it and get on with the job, debrief with colleagues or family, fix the problem themselves, or complain to management. The success level of the coping strategy was then ranked from 1 to 3.

The coping strategy responses were based on the detailed interviews of ONs and RTs from the same institutions in Stage 1 of the RICC study which were collected through semi-structured interviews of 16 RTs and 13 ONs at the same two hospital campuses.

Proportions of respondents experiencing stressors or using a coping strategy were compared by using the Chi-Squared test. Mean scores and standard deviations of the validated measures for ONs and RTs were derived. Correlation coefficients were also performed between the standardised total scores.

Results

There were 71 respondents out of 307 staff surveyed, which represented 26% of the ON and RTs at the two hospitals. The response rate for RTs was 37% and for ONs was 17%. Details of the sample are shown in Table 1.

Table 2 summarises the burnout, depression, anxiety, mental well-being and psychological resilience. There were no significant correlations between age or hours worked per week or years experience and any of the standardised scale total scores. MANOVA on the total scores for all five scales indicated that there were no significant main effects or any significant univariate effects according to gender or occupation.

Table 3 shows the correlation matrix between the total scores from these scales, with the critical *P* value adjusted to correct family-wise error rate (Bonferroni). As might be expected, depression was significantly correlated with anxiety and burnout, as well as being inversely related to mental well-being. Similarly, anxiety was significantly correlated with burnout and inversely correlated with mental well-being. There was a significant correlation between mental well-being and psychological resilience. All scales possessed adequate reliability (Cronbach alphas for PHQ9 = 0.791, GAD7+ = 0.898, SWEMBWS = 0.881 and CDRISC = 0.940). There were no significant differences in any of these scale scores according to any of the demographic variables shown in the upper section of Table 1.

Tables 4 and 5 present the ten major workplace and three major non-workplace stressors for each occupation,

Table 1. Demographic and working situation characteristics of study participants (*N* = 71).

Variable	Radiation therapists (<i>n</i> = 43)	Oncology nurses (<i>n</i> = 28)
Male	8 (18.6%)	1 (3.6%)
Female	35 (81.4%)	27 (96.4%)
Mean age	38.5 years (23–59)	42.4 years (20–61)
Single	8 (18.6%)	4 (14.3%)
Divorced or separated	3 (7%)	2 (7.1%)
Married or cohabitating	32 (74.4%)	22 (78.6%)
Have children	55.8%	53.6%
Care for others (not children)	11.6%	17.9%
Do shift work	88.4%	67.9%
Mean years experience in cancer care work	17.2 years (2–40)	11.5 years (1–28)
Mean hours/week spent in direct patient care	27.7 h (0–38)	28.9 h (0–38)

Table 2. Burnout, depression, mental well-being and anxiety scores for participants ($N = 71$).

Variable	Radiation therapists ($n = 43$)	Oncology nurses ($n = 28$)
Mean (SD) burnout	2.37 (0.787)	2.43 (1.03)
Mean (SD) PHQ9 (depression)	6.186 (3.711)	4.750 (3.340)
Mean (SD) GAD7 (anxiety)	11.651 (4.391)	10.429 (2.741)
Mean (SD) SWEMWBS (mental well-being)	24.56 (3.38)	26.18 (5.18)
Mean (SD) CDRISC (psychological resilience)	74.00 (9.45)	70.48 (19.39)
PHQ9 minimal	41.8%	53.6%
PHQ9 mild	44.2%	35.7%
PHQ9 moderate	11.6%	10.7%
PHQ9 moderately severe	2.4%	0%
PHQ9 severe	0%	0%
GAD7 original minimal	53.5%	71.4%
GAD7 original mild	41.9%	25.0%
GAD7 original moderate	2.3%	3.6%
GAD7 original severe	2.3%	0%

PHQ9, Patient Health Questionnaire for depression; GAD7, Generalised Anxiety Disorder Assessment; SWEMBS, Short Warwick-Edinburgh Mental Well-being Scale; CDRISC, Connor Davidson Resilience Scale.

Table 3. Correlation coefficients between standardised scale total scores.

Scale	GAD7+	SWEMBS	CDRISC	Burnout
PHQ9	0.794*	-0.368*	-0.085	0.538*
GAD7+		-0.358*	-0.079	0.586*
SWEMWBS			0.681*	-0.307
CDRISC				-0.108

PHQ9, Patient Health Questionnaire for depression; GAD7, Generalised Anxiety Disorder Assessment; SWEMBS, Short Warwick-Edinburgh Mental Well-being Scale; CDRISC, Connor Davidson Resilience Scale.

* $P < 0.005$.

plus details regarding the severity of those stressors, and the coping strategies used by participants. The 10 workplace stressors that were most frequently reported were similar across the two occupational groups. Both RTs and ONs listed workload overload as the most intensely experienced workplace stressor. Managing complex patient cases, having to carry the workloads and responsibilities of other staff, and the presence of rigid hierarchies in hospital administration were the most frequently encountered workplace stressors reported by

RTs. Concerns about the safety and care of patients was the most frequently reported workplace stressor reported by ONs. Of the three non-workplace stressors, two were identical for RTs and ONs, with ONs reporting that financial problems were a major source of stress outside the workplace and RTs reporting concerns about balancing their work-life demands. In terms of stressor frequency, RTs reported significantly more workplace and non-workplace stressors than ONs (M RTs = 93.53, M ONs = 78.59: $F(1,25) = 725.309$, $P < 0.001$). There was no significant difference in the mean severity ratings of workplace and non-workplace stressors reported by ONs (1.76) and RTs (1.83) ($F = 2.695$, $P = 0.114$).

A smaller percentage of ONs ($M = 45.88$) reported using any of the four coping strategies identified during the Stage 1 qualitative component of the RICC study, than for the RTs ($M = 59.92$: $F = 34.250$, $P < 0.001$). Approximately half to two-thirds of participants who reported different stressors used one of the four coping strategies listed in the scale as options. "Ignoring it and getting on with my job" was the most commonly reported coping strategy used by RTs, with a mean of 52.62% for the 10 workplace stressors. In comparison, the most frequently used coping strategy reported by ONs was "debriefing to colleagues and friends."

Discussion

This paper quantifies the types of stressors and coping strategies used by RTs and ONs in two large tertiary hospitals in Queensland. It was designed to give the investigators a framework to develop an intervention for RTs and ONs to improve their personal resources and cope better with the stresses of work.

Stress and burnout has been previously reported amongst cancer workers in Australia and New Zealand.^{7,16,17} In a large New Zealand cross-sectional study of cancer workers which included 111 RTs and 22 ONs, it was demonstrated that organisation stressors predicted for higher emotional exhaustion which in turn predicted for lower job satisfaction.¹⁷

For ONs, the proportion who reported stressors was significantly lower than for RTs (78% vs. 93.5% $P < 0.001$). Heavy workload was the most severely experienced workplace stressor for both groups but was highest in the RTs (93%) compared to 78.6% in ONs. The higher proportions of RTs reporting workplace stress may be related to the pressures of keeping to a specified schedule on the machines whereas ONs tend to have a more flexible time scheduling. The RTs have the additional stress of delivering their therapy in a highly exact manner with no room for error. The nursing model of patient care may be more flexible with less potential

Table 4. 10 most severe workplace stressors and three most severe non-workplace stressors for radiation therapists ($n = 43$), plus coping strategies used and percent of participants who found a strategy "Successful" in coping with the stressor.

¹ Work place stressors	² Percent who reported this stressor	³ Severity rating/4	⁴ Percent who reported using a coping strategy	Percent who used a coping strategy and found it to be "Successful" (i.e., 3/3)								¹³ Chi square
				Ignored it and got on with job		Debriefed to colleagues/family		Fixed the problem myself		Complained to management		
				⁵ % used	⁶ % success	⁷ % used	⁸ % success	⁹ % used	¹⁰ % success	¹¹ % used	¹² % success	
1. Heavy workload	93.0	2.08	62.8	67.9	44.4	14.3	50.6	7.1	50.0	10.7	0.0	3.433
2. Time pressure to process patients	93.0	2.00	60.5	42.3	36.4	38.5	20.0	15.4	75.0	3.8	0.0	9.340
3. New technology demands	90.7	2.00	58.1	40.0	50.0	16.0	25.0	36.0	62.5	8.0	0.0	3.638
4. New staff needing training	93.0	1.98	62.8	37.0	60.0	7.4	0.0	33.3	12.5	22.2	0.0	10.564
5. Micromanagement by senior staff	93.0	1.90	62.8	55.6	40.0	37.0	10.0	3.7	100	3.7	0.0	9.102
6. Poor senior management	95.3	1.87	72.1	61.3	47.4	29.0	11.1	9.0	66.7	0.0		6.220
7. Complex patient cases	95.3	1.83	65.1	32.1	33.3	50.0	30.8	17.9	80.0	0.0		10.699
8. Carrying other staff responsibilities	95.3	1.78	67.4	51.7	60.0	27.6	12.5	13.8	75.0	6.9	0.0	10.074
9. Lack of job prospects	93.0	1.73	53.5	78.3	55.6	8.7	100	8.7	0.0	4.3	0.0	10.015
10. Rigid hierarchy (too many junior staff)	95.3	1.68	58.1	60.0	46.7	16.0	0.0	12.0	66.7	12.0	33.3	14.179
Non-workplace stressors				Ignored it and got on with my life		Debriefed to family/friends		Fixed the problem myself		Complained to my family/friends		
1. Own health and fitness	93.0	1.73	48.8	33.3	50.0	19.0	25.0	47.6	50.0	0.0		6.567
2. Family health problems	93.0	1.70	55.8	37.5	75.0	54.2	15.4	4.2	100	4.3	0.0	14.400
3. Poor work-life balance	93.0	1.63	51.2	59.1	41.7	13.6	0.0	13.63	33.3	13.0	0.0	4.608

Critical $P < 0.003$. ¹Ten most severely ranked stressors. ²% of workers reporting this stressor. ³Mean severity rating out of a range from 1 to 4. ⁴% reporting using a coping strategy. ^{5, 7, 9, 11}% using each of the four specific coping strategies. ^{6, 8, 10, 12}% success of each specific coping strategy. ¹³Chi Square.

for harm to the patient. Interestingly, ONs tended to report poor communication with senior staff as a source of stress more than RTs. Both groups frequently experienced frustration with the hospital hierarchy but this tended to be less severe than some of the other factors. Patient related stressors were more apparent for ONs, such as concerns about safety and care and managing their anxiety related to treatment as well as the patient load. It is postulated that nurses may be less

emotionally distant from their patients than other oncology professional groups and consequently are more predisposed to stress related to patient circumstances.¹⁸ High work demand, low control and low reward have been shown to predict for negative effect in ONs.⁴

There were no significant differences in the coping strategies used by RTs and ONs. Due to the relatively conservative numbers sampled, small differences between these groups may have been missed. RTs appear to have

Table 5. 10 most severe workplace stressors for radiation oncology nurses (*n* = 28), plus three most severe non-workplace stressors, plus coping strategies and percent of participants who found a strategy “Successful” in coping with the stressor.

¹ Work place stressors	² Percent who reported this stressor	³ Severity rating/4	⁴ Percent who reported using a coping strategy	Percent who used a coping strategy and found it to be “Successful” (i.e., 3/3)								¹³ chi square
				⁵ Ignored it and got on with job used	⁶ % success	⁷ Debriefed to colleagues/family used	⁸ % success	⁹ Fixed the problem myself used	¹⁰ % success	¹¹ Complained to management used	¹² % success	
1. Heavy patient load	78.6	1.91	50.0	35.7	40.0	64.3	55.6	0.0	0	0.0	0	1.244
2. Poor communication with senior staff	78.6	1.86	50.0	64.3	44.4	28.6	0.0	7.1	100	0.0	0	5.697
3. Frustration with the hospital system	78.6	1.82	39.3	27.3	66.7	72.7	37.5	0.0	0	0.0	0	2.429
= 4. Rigid hierarchy in hospital administration	78.6	1.77	42.9	41.1	60.0	58.3	14.3	0.0	0	0.0	0	3.429
= 4. Absent colleagues and extra work	78.6	1.77	50.0	21.4	16.7	42.9	66.7	14.3	0	0.0	0	10.267
6. Poor decision-making by senior staff	78.6	1.73	50.0	17.9	60.0	58.3	0.0	0.0	0	0.0	0	6.514
7. Safety and care of patients	82.1	1.69	57.1	10.7	66.7	43.8	71.4	25.0	25.0	12.5	0	9.754
= 8. Patients’ anxiety about their treatment	78.6	1.69	42.9	10.7	66.7	41.7	40.0	33.3	50.0	0.0	0	1.600
= 8. Poor support from supervisor	78.6	1.68	35.7	17.9	40.0	50.0	20.0	0.0	0	0.0	0	0.677
= 8. Work area inadequacies	78.6	1.68	42.9	25.0	42.9	33.3	50.0	8.3	0	0.0	0	3.664
Non-workplace stressors				Ignored it and got on with my life		Debriefed to family/friends		Fixed the problem myself		Complained to my family/friends		
1. Financial problems	78.6	1.86	46.4	30.8	75.0	30.8	0.0	30.8	50.0	7.7	0	7.367
2. Family health problems	78.6	1.77	46.4	23.1	66.7	76.9	20.0	0.0	0	0.0	0	3.611
3. Own health and fitness	75.0	1.71	42.9	25.0	66.7	33.3	25.0	41.7	60.0	0.0	0	2.700

Critical *P* < 0.003. ¹Ten most severely ranked stressors. ²% of workers reporting this stressor. ³Mean severity rating out of a range from 1 to 4. ⁴% reporting using a coping strategy. ^{5,7,9,11}% using each of the four specific coping strategies. ^{6,8,10,12}% success of each specific coping strategy. ¹³Chi Square.

better coping strategies than ONs (59.9% vs. 45.8% (*P* < 0.001). There was no universally more successful coping strategy and passive strategies (e.g. ignoring the problem) seemed to be equally effective as more active coping mechanisms (e.g. complaining to management). It was noteworthy that complaining to the management was infrequently used and almost universally unsuccessful for both RTs and ON suggesting that there may be room for improvement in line manager’s listening to their staff. It may well be that the coping strategies that were chosen in the questionnaire did not resonate with this group of participants, many of whom were not in the interview study. For instance “seeking professional help” was not an option included in this questionnaire which may have been a short coming in the questionnaire design.

Overall, these results suggest that there may not be a universally successful coping strategy for all stressors, but that different coping responses might work more or less effectively for different stressors. The findings would argue against the use of a “one size fits all” approach to helping RTs and ONs cope most effectively with the stressors they encounter in the workplace or out of it, and rather suggest that an ideographic perspective might provide the highest likelihood of success in handling these stressors. The lack of a significant relationship between success at coping with stressors and the measures of mental health may indicate that, although the 13 stressors described by each of the two occupation groups were reported as being reasonably severe, they were not so severe as to be significantly related to the three indices of mental health used here.

Limitations of this study include the restriction of the sample to only two settings in a single city in Australia, thus also restricting the generalisability of the findings to other settings and samples. Further, the current sample was measured only once, and no comments can be made regarding these findings over time. Furthermore, the effectiveness of any of the coping mechanisms is a perceived one rather than a measured one. Potentially participants with depression and anxiety may have experienced limitations in the accuracy of self assessment of the effectiveness of coping mechanisms. Important coping mechanisms such as seeking professional help were not included in the questionnaire and this is a potential short coming of the study. The sample size of 26% may not be truly representative of the RTs and ONs and is a potential source of bias. Finally, although RTs and ONs represent the two largest groups of workers in this field, inclusion of other groups might allow for a more broad-based model of stress in cancer workers to be compiled.

The information gained from this questionnaire has assisted us in designing a workshop for RTs and ONs with the primary focus of increasing the personal resources to cope with work-related stressors. The emphasis of the workshop will be to promote recovery experience which should buffer against burnout.

Conclusions

This cross-sectional study of 71 RTs and ONs in two large tertiary hospitals in Queensland describes the frequency and severity of reported stressors which were described from a previous interview study from the same institutions. In addition the effectiveness of various coping mechanisms is reported.

RTs and ONs did not experience significantly different levels of anxiety, depression, burnout, mental well-being or resilience. The types of work-related and non-work-related stressors were similar. The proportion of RTs experiencing stressors was significantly higher than ONs and they were more likely to utilise coping strategies. There was no significant difference identified in the success rates for the different coping strategies. Clearly this is an area that needs more research directed to it on a larger scale. A real investment needs to be made in evaluating the effectiveness of interventions to improve the personal resources of workers to cope with the stressors of the oncology caseload. The results of this research have assisted us in designing a 1 day interventional workshop for RTs and ONs which is aimed at improving the personal resources of workers in coping with stress. This study is currently in progress and will be reported at a later date.

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Conflict of Interest

The funds were paid for statistical analysis and interviews by Chris Sharpley. Anne Poulsen is the Director of Work Life Balance Solutions (Queensland).

References

1. Lyon BL. Conquering stress. *Reflect Nurs Leadersh* 2000; **26**: 43.
2. Lazarus RS, Folkman S. Psychological stress and the coping process. Springer, New York, NY, 1984.
3. Dougherty E, Pierce B, Ma C, Panzarella T, Rodin G, Zimmermann C. Factors associated with work stress and professional satisfaction in oncology staff. *Am J Hosp Palliat Care* 2009; **26**: 105–11.
4. Johnston DW, Jones MC, Charles K, McCann SK, McKee L. Stress in nurses: stress-related affect and its determinants examined over the nursing day. *Ann Behav Med* 2013; **45**: 348–56.
5. Pierce B, Dougherty E, Panzarella T, Le LW, Rodin G, Zimmermann C. Staff stress, work satisfaction, and death attitudes on an oncology palliative care unit, and on a medical and radiation oncology inpatient unit. *J Palliat Care* 2007; **23**: 32–9.
6. Probst H, Griffiths S, Adams R, Hill C. Burnout in therapy radiographers in the UK. *Br J Radiol* 2012; **85**: e760–5.
7. Girgis A, Hansen V, Goldstein D. Are Australian oncology health professionals burning out? A view from the trenches. *Eur J Cancer* 2009; **45**: 393–9.
8. Poulsen MG, Poulsen AA, Khan A, Poulsen EE, Khan SR. Work Engagement in Cancer Workers in Queensland- the flip side of burnout. *J Med Imaging Radiat Oncol* 2011; **55**: 425–32.
9. Mazur L, Mosaly P, Jackson M, Chang S, Burkhardt K, Adams R, Marks L. Quantitative assessment of workload and stressors in clinical radiation oncology. *Int J Radiat Oncol Biol Phys* 2012; **83**: e571–6.
10. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001; **16**: 606–13.
11. Spitzer R, Kroenke K, Williams J, Lowe B. A brief measure for assessing Generalized Anxiety Disorder. *Arch Intern Med* 2006; **166**: 1092–7.

12. Stewart-Brown S, Tennant A, Tennant R, Platt S, Parkinson J, Weich S. Internal construct validity of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS): a Rasch analysis using data from the Scottish Health Education Population Survey. *Health Qual Life Outcomes* 2009; **7**: 15–23.
13. Schmoldt RA, Freeborn DK, Klevit HD. Physician burnout: recommendations for HMO managers. *HMO Pract* 1994; **8**: 58–63.
14. Hansen V, Girgis A. Can a single question effectively screen for burnout in Australian cancer care workers? *BMC Health Serv Res* 2010; **10**: 341.
15. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). *Depress Anxiety* 2003; **18**: 76–82.
16. Gallagher R, Gormley DK. Perceptions of stress, burnout, and support systems in pediatric bone marrow transplantation nursing. *Clin J Oncol Nurs* 2009; **13**: 681–5.
17. Jasperse M, Herst P, Dungey G. Evaluating stress, burnout and job satisfaction in New Zealand radiation oncology departments. *Eur J Cancer Care* 2014; **23**: 82–8.
18. Kash KM, Holland JC, Breitbart W, et al. Stress and burnout in oncology. *Oncology* 2000; **14**: 1621–33; discussion 33–4, 36–7.